

PACIFIC NORTHWEST NATIONAL LAB

ELECTRIC ADSORPTION HEAT PUMP FOR ELECTRIC VEHICLES

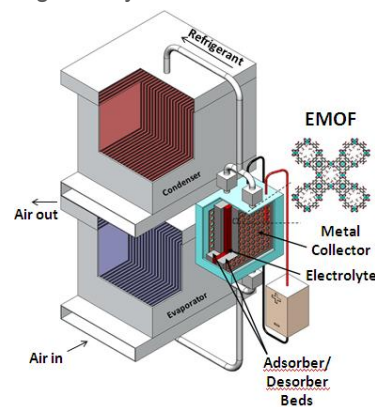
PROJECT TITLE:	Electric-Powered Adsorption Heat Pump for Electric Vehicles		
ORGANIZATION:	Pacific Northwest National Laboratory (PNNL)	LOCATION:	Richland, WA
PROGRAM:	HEATS	ARPA-E AWARD:	\$803,142
TECH TOPIC:	Electric Vehicles	PROJECT TERM:	11/21/11 – 12/20/13
WEBSITE:	www.pnnl.gov		

CRITICAL NEED

The transportation sector is the dominant source of U.S. dependence on foreign oil and a major contributor of greenhouse gas emissions. Enabling more widespread use of electric vehicles (EVs) would reduce both our dependence on foreign oil and our harm to the environment. Inefficient heating and cooling systems can limit the driving range of EVs by acting as a drain on their batteries. More efficient technologies are needed to provide heating and cooling to EVs without draining the on-board battery packs, in effect extending the driving range of EVs per electric charge. These efficient technologies may also enable thermal management of internal-combustion engine vehicles.

PROJECT INNOVATION + ADVANTAGES

PNNL is developing a new class of advanced nanomaterial called an electrical metal organic framework (EMOF) for EV heating and cooling systems. The EMOF would function similar to a conventional heat pump, which circulates heat or cold to the cabin as needed. However, by directly controlling the EMOF's properties with electricity, the PNNL design is expected to use much less energy than traditional heating and cooling systems. The EMOF-based heat pumps would be light, compact, efficient, and run using virtually no moving parts.



IMPACT

If successful, PNNL's EMOF-based heat pump could provide efficient heating and cooling for EVs with less impact on vehicle driving range.

- **SECURITY:** Increased use of EVs would decrease U.S. dependence on foreign oil – the transportation sector is the dominant source of this dependence.
- **ENVIRONMENT:** Greater use of EVs would reduce greenhouse gas emissions, 28% of which come from the transportation sector.
- **ECONOMY:** This technology would increase the marketability of EVs—helping spur growth in the automobile industry.
- **JOBS:** Increased use of EVs could create new manufacturing and engineering jobs in the automobile industry.

CONTACTS

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